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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/726,944	12/03/2003	Avneesh Agrawal	030113	5408

23696 7590 06/30/2006

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EXAMINER	
HO, CHUONG T	
ART UNIT	**PAPER NUMBER**
2616	

DATE MAILED: 06/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)	
Office Action Summary	10/726,944	AGRAWAL ET AL.	
	Examiner	**Art Unit**	
	CHUONG T. HO	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 February 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14,16,17,29 and 31-50* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *13,14,16,17,29 and 31-35* is/are allowed.

6)☒ Claim(s) *1-12 and 36-50* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

1. The amendment filed 02/23/06 have been entered and made of record.

2. Applicant's arguments with respect to claims 02/23/06 have been considered but are moot in view of the new ground(s) of rejection.

3. Claims 1-14, 16, 17, 29, 31-50 are pending.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-7, 36, 8, 37, 9-11, 38, 12, 39-44, 45-48, 49-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liang et al. (U.S.Patent No. 2003/0165131 A1) in view of Bae et al. (U.S.Patent No. 2002/0097697 A1).

Regarding to claim 1, Liang discloses, see page 5, [0080], figure 4, the pilot symbols are generated in the frequency domain and later converted back to the time domain and time-multiplexed with spread data. Unlike the packet 40 for data independent pilot symbols, every block for the new packet structure has a data dependent pilot symbol with pilot chips. The pilot chips 56 for the block 52 is based upon the data 54 for that block 52 (see page 5, [0080], figure 4); comprising:

- Processing at least one pilot symbol (see page 5, [0080], figure 4, the pilot symbols are generated in the frequency domain and later converted back to the

time domain and time-multiplexed with spread data. Unlike the packet 40 for data independent pilot symbols, every block for the new packet structure has a data dependent pilot symbol with pilot chips. The pilot chips 56 for the block 52 is based upon the data 54 for that block 52) with a pseudo-random number (PN) code (spread codes) (see page 5, [0077], Data symbols 44 and pilot symbols in the OFDM block 42 for each of the users are individually spread with user-specific spread codes) to obtain a sequence of pilot chips for the wireband (frequency band, see page 1, [0006]) pilot;

- Processing data symbols in accordance with a multi-carrier modulation scheme (see page 5, [0077], these pilot symbols are placed together as an orthogonal frequency division multiplexing (OFDM) block 42 and is common to data symbols 44 for all users. Data symbols 44 and pilot symbols in the OFDM bock 42 for each of the users are individually spread with user-specific spread codes);

However, Liang is silent to disclosing time division multiplexing the sequence of pilot chips with the sequence of data chips to obtain a time division multiplexed (TDM) sequence of pilot and data chips.

Bae et al. discloses time division multiplexing (TDM) (see figure 2, 230) of pilot chips (see figure 1A) with the sequence of data chips (see figure 1A) to obtain a time division multiplexed (TDM) (see figure 2, 230) sequence of pilot (see figure 12) and data chips (figure 12); and transmitting the TDM (see figure 2, 230) sequence of pilot (see figure 12) and data chips (figure 12) (see page 10, [0085], [0086]);

Wherein a plurality of periods (see figure 11, page 9, [0082], this process is performed in a period of time corresponding to a predetermined number of slots) for the sequences of data chip (see figures 12, 13) are provided between periods for the sequences of pilot chips (see page 10, [0085] [0086]).

Both Liang, Bae discloses pilot chips and data. Bae recognizes time division multiplexing the sequence of pilot chips with the sequence of data chips to obtain a time division multiplexed (TDM) sequence of pilot and data chips. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Liang with the teaching of Bae to provide time division multiplexing the sequence of pilot chips with the sequence of data chips to obtain a time division multiplexed (TDM) sequence of pilot and data chips in order to improve the performance of CDMA downlink transmissions, receivers.

6. In the claims 2, Liang discloses the wireless multi-carrier communication system is an orthogonal frequency division multiple access (OFDMA) (see page 1, [0004] [0005]) communication system, and wherein the multi-carrier modulation scheme is orthogonal frequency division multiplexing (OFDM) (see page 1, [0004] [0005]).

7. In the claim 3, Liang discloses the limitation of claim 1 above.

However, Liang is silent to disclosing the at least one pilot symbol is spectrally spread with the PN code in time domain using direct sequence spread spectrum processing to obtain the sequence of pilot chips

Bae discloses the at least one pilot symbol is spectrally spread with the PN code (256 PN chips per slot for pilot channel, see figure 2) in time domain using direct

sequence spread spectrum processing to obtain the sequence of pilot chips (pilot = 128 chips, see figure 1, 12).

Both Liang, Bae discloses pilot chips and data. Bae recognizes the at least one pilot symbol is spectrally spread with the PN code in time domain using direct sequence spread spectrum processing to obtain the sequence of pilot chips. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Liang with the teaching of Bae to provide the at least one pilot symbol is spectrally spread with the PN code in time domain using direct sequence spread spectrum processing to obtain the sequence of pilot chips in order to improve the performance of CDMA downlink transmissions, receivers.

8. In the claim 4, Liang discloses the limitations of claim 1 above.

However, Liang is silent to disclosing the PN code uniquely identifies a transmitting entity of the wideband pilot.

Bae discloses the PN code (pilot = 128 chips, see figures 1, 12) uniquely identifies a transmitting entity of the wideband (frequency band, see [0018]) pilot .

Both Liang, Bae discloses pilot chips and data. Bae recognizes the at least one pilot symbol is spectrally spread with the PN code in time domain using direct sequence spread spectrum processing to obtain the sequence of pilot chips. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Liang with the teaching of Bae to provide the at least one pilot symbol is spectrally spread with the PN code in time domain using direct sequence spread

spectrum processing to obtain the sequence of pilot chips in order to improve the performance of CDMA downlink transmissions, receivers .

9. In the claim 6, Liang discloses the limitations of claim 1 above.

However, Liang is silent to disclosing scaling the sequence of pilots with a scaling factor to obtain a sequence of scaled pilot chips, wherein the scaling factor is indicative of a transmit power level for the wideband pilot, and wherein the sequence of scaled pilot chips is time division multiplexed with the sequence of data chips.

Bae discloses scaling the sequence of pilots with a scaling factor (see page 3, [0045]) to obtain a sequence of scaled pilot chips (see page 3, [0045]), wherein the scaling factor is indicative of a transmit power level for the wideband pilot, and wherein the sequence of scaled pilot chips (see page 3, [0045]) is time division multiplexed with the sequence of data chips (see figure 1, 12) (see page 14, [0149], If the mobile station exists in a handoff region and thus can simultaneously receive the packet data from the base stations having the high power level, the mobile station measures CIR values of the respective base stations and then transmits an index of a base station having the maximum available data rate over the reverse sector indicator channel in sync with the DRC information transmission start point, considering all the Walsh code allocation information of the respective base stations).

Both Liang, Bae discloses pilot chips and data. Bae recognizes scaling the sequence of pilots with a scaling factor to obtain a sequence of scaled pilot chips, wherein the scaling factor is indicative of a transmit power level for the wideband pilot, and wherein the sequence of scaled pilot chips is time division multiplexed with the

sequence of data chips. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Liang with the teaching of Bae to provide scaling the sequence of pilots with a scaling factor to obtain a sequence of scaled pilot chips, wherein the scaling factor is indicative of a transmit power level for the wideband pilot, and wherein the sequence of scaled pilot chips is time division multiplexed with the sequence of data chips in order to improve the performance of CDMA downlink transmissions, receivers .

10. In the claim 5, Liang discloses the system includes a plurality of subbands, and wherein the data symbols are sent on different ones of the plurality of subbands in different time intervals (see page 5, [0079], the transmission period of the pilot symbol) as determined by a frequency hopping (FH) sequence.

11. In the claim 7, Liang discloses the limitations of claim 1 above.

However, Liang is silent to disclosing the TDM sequence of pilot and data chips is transmitted on a reverse link in the system .

Bae et al. discloses the TDM (see page 3, [0045]) sequence of pilot and data chips is transmitted on a reverse link in the system .

Both Liang, Bae discloses pilot chips and data. Bae recognizes the TDM sequence of pilot and data chips is transmitted on a reverse link in the system. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Liang with the teaching of Bae to provide the TDM sequence of pilot and data chips is transmitted on a reverse link in the system in order to improve the performance of CDMA downlink transmissions, receivers.

12. In the claim 8, Liang discloses, see page 5, [0080], figure 4, the pilot symbols are generated in the frequency domain and later converted back to the time domain and time-multiplexed with spread data. Unlike the packet 40 for data independent pilot symbols, every block for the new packet structure has a data dependent pilot symbol with pilot chips. The pilot chips 56 for the block 52 is based upon the data 54 for that block 52 (see page 5, [0080], figure 4); comprising:

- Processing at least one pilot symbol (see page 5, [0080], figure 4, the pilot symbols are generated in the frequency domain and later converted back to the time domain and time-multiplexed with spread data. Unlike the packet 40 for data independent pilot symbols, every block for the new packet structure has a data dependent pilot symbol with pilot chips. The pilot chips 56 for the block 52 is based upon the data 54 for that block 52) with a pseudo-random number (PN) code (spread codes) (see page 5, [0077], Data symbols 44 and pilot symbols in the OFDM block 42 for each of the users are individually spread with user-specific spread codes) to obtain a sequence of pilot chips for the wireband (frequency band, see page 1, [0006]) pilot;
- Processing data symbols in accordance with a multi-carrier modulation scheme (see page 5, [0077], these pilot symbols are placed together as an orthogonal frequency division multiplexing (OFDM) block 42 and is common to data symbols 44 for all users. Data symbols 44 and pilot symbols in the OFDM bock 42 for each of the users are individually spread with user-specific spread codes);

However, Liang is silent to disclosing time division multiplexing the sequence of pilot chips with the sequence of data chips to obtain a time division multiplexed (TDM) sequence of pilot and data chips.

Bae et al. discloses time division multiplexing (TDM) (see figure 2, 230) of pilot chips (see figure 1A) with the sequence of data chips (see figure 1A) to obtain a time division multiplexed (TDM) (see figure 2, 230) sequence of pilot (see figure 12) and data chips (figure 12); and transmitting the TDM (see figure 2, 230) sequence of pilot (see figure 12) and data chips (figure 12) (see page 10, [0085], [0086]);
Wherein a plurality of periods (see figure 11, page 9, [0082], this process is performed in a period of time corresponding to a predetermined number of slots) for the sequences of data chip (see figures 12, 13) are provided between periods for the sequences of pilot chips (see page 10, [0085] [0086]).

Both Liang, Bae discloses pilot chips and data. Bae recognizes time division multiplexing the sequence of pilot chips with the sequence of data chips to obtain a time division multiplexed (TDM) sequence of pilot and data chips. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Liang with the teaching of Bae to provide time division multiplexing the sequence of pilot chips with the sequence of data chips to obtain a time division multiplexed (TDM) sequence of pilot and data chips in order to improve the performance of CDMA downlink transmissions, receivers.

13. Regarding to claim 9, Liang discloses, see page 5, [0080], figure 4, the pilot symbols are generated in the frequency domain and later converted back to the time

domain and time-multiplexed with spread data. Unlike the packet 40 for data independent pilot symbols, every block for the new packet structure has a data dependent pilot symbol with pilot chips. The pilot chips 56 for the block 52 is based upon the data 54 for that block 52 (see page 5, [0080], figure 4); comprising:

- A modulator (see page 2, [0012], each of the multiple parallel low-rate streams is modulated using a different sub-carrier) operative to process data symbols (see page 2, [0013]) in accordance with a multi-carrier modulation (see page 2, [0012] scheme to obtain a sequence of data chips (see page 2, [0019]);
- Processing at least one pilot symbol (see page 5, [0080], figure 4, the pilot symbols are generated in the frequency domain and later converted back to the time domain and time-multiplexed with spread data. Unlike the packet 40 for data independent pilot symbols, every block for the new packet structure has a data dependent pilot symbol with pilot chips. The pilot chips 56 for the block 52 is based upon the data 54 for that block 52) with a pseudo-random number (PN) code (spread codes) (see page 5, [0077], Data symbols 44 and pilot symbols in the OFDM block 42 for each of the users are individually spread with user-specific spread codes) to obtain a sequence of pilot chips for the wireband (frequency band, see page 1, [0006]) pilot;
- Processing data symbols in accordance with a multi-carrier modulation scheme (see page 5, [0077], these pilot symbols are placed together as an orthogonal frequency division multiplexing (OFDM) block 42 and is common to data symbols

44 for all users. Data symbols 44 and pilot symbols in the OFDM bock 42 for each of the users are individually spread with user-specific spread codes);

However, Liang is silent to disclosing time division multiplexing the sequence of pilot chips with the sequence of data chips to obtain a time division multiplexed (TDM) sequence of pilot and data chips.

Bae et al. discloses time division multiplexing (TDM) (see figure 2, 230) of pilot chips (see figure 1A) with the sequence of data chips (see figure 1A) to obtain a time division multiplexed (TDM) (see figure 2, 230) sequence of pilot (see figure 12) and data chips (figure 12); and transmitting the TDM (see figure 2, 230) sequence of pilot (see figure 12) and data chips (figure 12) (see page 10, [0085], [0086]); comprising:
Wherein a plurality of periods (see figure 11, page 9, [0082], this process is performed in a period of time corresponding to a predetermined number of slots) for the sequences of data chip (see figures 12, 13) are provided between periods for the sequences of pilot chips (see page 10, [0085] [0086]).

Both Liang, Bae discloses pilot chips and data. Bae recognizes time division multiplexing the sequence of pilot chips with the sequence of data chips to obtain a time division multiplexed (TDM) sequence of pilot and data chips. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Liang with the teaching of Bae to provide time division multiplexing the sequence of pilot chips with the sequence of data chips to obtain a time division multiplexed (TDM) sequence of pilot and data chips in order to improve the performance of CDMA downlink transmissions, receivers.

14. In the claim 10, Liang discloses the limitations of claim 1 above.

However, Liang is silent to disclosing a terminal.

Bae et al. discloses a terminal (see abstract).

Both Liang, Bae discloses pilot chips and data. Bae recognizes a terminal. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Liang with the teaching of Bae to provide a terminal in order to improve the performance of CDMA downlink transmissions, receivers.

15. In the claim 11, Liang discloses the limitations of claim 1 above.

However, Liang is silent to disclosing a base station.

Bae et al. discloses a base station (see abstract).

Both Liang, Bae discloses pilot chips and data. Bae recognizes a base station. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Liang with the teaching of Bae to provide a base station in order to improve the performance of CDMA downlink transmissions, receivers.

16. In the claim 12, Liang discloses, see page 5, [0080], figure 4, the pilot symbols are generated in the frequency domain and later converted back to the time domain and time-multiplexed with spread data. Unlike the packet 40 for data independent pilot symbols, every block for the new packet structure has a data dependent pilot symbol with pilot chips. The pilot chips 56 for the block 52 is based upon the data 54 for that block 52 (see page 5, [0080], figure 4); comprising:

- Processing at least one pilot symbol (see page 5, [0080], figure 4, the pilot symbols are generated in the frequency domain and later converted back to the time domain and time-multiplexed with spread data. Unlike the packet 40 for data independent pilot symbols, every block for the new packet structure has a data dependent pilot symbol with pilot chips. The pilot chips 56 for the block 52 is based upon the data 54 for that block 52) with a pseudo-random number (PN) code (spread codes) (see page 5, [0077], Data symbols 44 and pilot symbols in the OFDM block 42 for each of the users are individually spread with user-specific spread codes) to obtain a sequence of pilot chips for the wireband (frequency band, see page 1, [0006]) pilot;
- Processing data symbols in accordance with a multi-carrier modulation scheme (see page 5, [0077], these pilot symbols are placed together as an orthogonal frequency division multiplexing (OFDM) block 42 and is common to data symbols 44 for all users. Data symbols 44 and pilot symbols in the OFDM bock 42 for each of the users are individually spread with user-specific spread codes);

However, Liang is silent to disclosing time division multiplexing the sequence of pilot chips with the sequence of data chips to obtain a time division multiplexed (TDM) sequence of pilot and data chips.

Bae et al. discloses time division multiplexing (TDM) (see figure 2, 230) of pilot chips (see figure 1A) with the sequence of data chips (see figure 1A) to obtain a time division multiplexed (TDM) (see figure 2, 230) sequence of pilot (see figure 12) and data

chips (figure 12); and transmitting the TDM (see figure 2, 230) sequence of pilot (see figure 12) and data chips (figure 12) (see page 10, [0085], [0086]);

Wherein a plurality of periods (see figure 11, page 9, [0082], this process is performed in a period of time corresponding to a predetermined number of slots) for the sequences of data chip (see figures 12, 13) are provided between periods for the sequences of pilot chips (see page 10, [0085] [0086]).

Both Liang, Bae discloses pilot chips and data. Bae recognizes time division multiplexing the sequence of pilot chips with the sequence of data chips to obtain a time division multiplexed (TDM) sequence of pilot and data chips. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Liang with the teaching of Bae to provide time division multiplexing the sequence of pilot chips with the sequence of data chips to obtain a time division multiplexed (TDM) sequence of pilot and data chips in order to improve the performance of CDMA downlink transmissions, receivers.

17. In the claim 36, Liang discloses the limitations of claim 1 above.

However, Liang is silent to disclosing a time between periods for the sequences of pilot chips comprises a period less than a decorrelation time for a channel through which the sequence of pilot chips are being transmitted.

Bae discloses a time between periods for the sequences of pilot chips comprises a period less than a decorrelation time for a channel through which the sequence of pilot chips are being transmitted (see figures 11, 12, 13, page 10, [0085] [0086]).

Both Liang, Bae discloses pilot chips and data. Bae recognizes a time between periods for the sequences of pilot chips comprises a period less than a decorrelation time for a channel through which the sequence of pilot chips are being transmitted. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Liang with the teaching of Bae to provide a time between periods for the sequences of pilot chips comprises a period less than a decorrelation time for a channel through which the sequence of pilot chips are being transmitted in order to improve the performance of CDMA downlink transmissions, receivers.

18. In the claim 37, claim 37 is rejected the same reason of claim 36 above.

19. In the claim 38, claim 39 is rejected the same reason of claim 36 above.

20. In the claim 39, Liang discloses, see page 5, [0080], figure 4, the pilot symbols are generated in the frequency domain and later converted back to the time domain and time-multiplexed with spread data. Unlike the packet 40 for data independent pilot symbols, every block for the new packet structure has a data dependent pilot symbol with pilot chips. The pilot chips 56 for the block 52 is based upon the data 54 for that block 52 (see page 5, [0080], figure 4); comprising:

- Processing at least one pilot symbol (see page 5, [0080], figure 4, the pilot symbols are generated in the frequency domain and later converted back to the time domain and time-multiplexed with spread data. Unlike the packet 40 for data independent pilot symbols, every block for the new packet structure has a data dependent pilot symbol with pilot chips. The pilot chips 56 for the block 52 is

based upon the data 54 for that block 52) with a pseudo-random number (PN) code (spread codes) (see page 5, [0077], Data symbols 44 and pilot symbols in the OFDM block 42 for each of the users are individually spread with user-specific spread codes) to obtain a sequence of pilot chips for the wireband (frequency band, see page 1, [0006]) pilot;

- Processing data symbols in accordance with a multi-carrier modulation scheme (see page 5, [0077], these pilot symbols are placed together as an orthogonal frequency division multiplexing (OFDM) block 42 and is common to data symbols 44 for all users. Data symbols 44 and pilot symbols in the OFDM bock 42 for each of the users are individually spread with user-specific spread codes);

However, Liang is silent to disclosing time division multiplexing the sequence of pilot chips with the sequence of data chips to obtain a time division multiplexed (TDM) sequence of pilot and data chips.

Bae et al. discloses time division multiplexing (TDM) (see figure 2, 230) of pilot chips (see figure 1A) with the sequence of data chips (see figure 1A) to obtain a time division multiplexed (TDM) (see figure 2, 230) sequence of pilot (see figure 12) and data chips (figure 12); and transmitting the TDM (see figure 2, 230) sequence of pilot (see figure 12) and data chips (figure 12) (see page 10, [0085], [0086]) on the assigned one of the plurality of subbands (see figure 3);

Assigning data symbols (see page 10, [0087], data symbol is spread with Wash codes having a length of 32 chips) for transmission on different ones of a plurality of subbands

(see figure 11, channel) in different time intervals (see page 9, [0082], period of time) according to a frequency hopping (FH) sequence).

Both Liang, Bae discloses pilot chips and data. Bae recognizes time division multiplexing the sequence of pilot chips with the sequence of data chips to obtain a time division multiplexed (TDM) sequence of pilot and data chips. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Liang with the teaching of Bae to provide time division multiplexing the sequence of pilot chips with the sequence of data chips to obtain a time division multiplexed (TDM) sequence of pilot and data chips in order to improve the performance of CDMA downlink transmissions, receivers.

21. In the claim 40, Liang discloses the wireless multi-carrier communication system is an orthogonal frequency division multiple access (OFDMA) (see page 1, [0004] [0005]) communication system, and wherein the multi-carrier modulation scheme is orthogonal frequency division multiplexing (OFDM) (see page 1, [0004] [0005]).

22. In the claim 41, claim 41 is rejected with the same reason of claim 3 above.

23. In the claim 42, claim 42 is rejected with the same reason of claim 4 above.

24. In the claim 43, claim 43 is rejected with the same reason of claim 6 above.

25. In the claim 44, claim 44 is rejected with the same reason of claim 7 above.

26. In the claim 45, Liang discloses, see page 5, [0080], figure 4, the pilot symbols are generated in the frequency domain and later converted back to the time domain and time-multiplexed with spread data. Unlike the packet 40 for data independent pilot symbols, every block for the new packet structure has a data dependent pilot symbol

with pilot chips. The pilot chips 56 for the block 52 is based upon the data 54 for that block 52 (see page 5, [0080], figure 4); comprising:

- Processing at least one pilot symbol (see page 5, [0080], figure 4, the pilot symbols are generated in the frequency domain and later converted back to the time domain and time-multiplexed with spread data. Unlike the packet 40 for data independent pilot symbols, every block for the new packet structure has a data dependent pilot symbol with pilot chips. The pilot chips 56 for the block 52 is based upon the data 54 for that block 52) with a pseudo-random number (PN) code (spread codes) (see page 5, [0077], Data symbols 44 and pilot symbols in the OFDM block 42 for each of the users are individually spread with user-specific spread codes) to obtain a sequence of pilot chips for the wireband (frequency band, see page 1, [0006]) pilot;
- Processing data symbols in accordance with a multi-carrier modulation scheme (see page 5, [0077], these pilot symbols are placed together as an orthogonal frequency division multiplexing (OFDM) block 42 and is common to data symbols 44 for all users. Data symbols 44 and pilot symbols in the OFDM bock 42 for each of the users are individually spread with user-specific spread codes);

However, Liang is silent to disclosing time division multiplexing the sequence of pilot chips with the sequence of data chips to obtain a time division multiplexed (TDM) sequence of pilot and data chips.

Bae et al. discloses time division multiplexing (TDM) (see figure 2, 230) of pilot chips (see figure 1A) with the sequence of data chips (see figure 1A) to obtain a time division

multiplexed (TDM) (see figure 2, 230) sequence of pilot (see figure 12) and data chips (figure 12); and transmitting the TDM (see figure 2, 230) sequence of pilot (see figure 12) and data chips (figure 12) (see page 10, [0085], [0086]) on the assigned one of the plurality of subbands (see figure 3);

Assigning data symbols (see page 10, [0087], data symbol is spread with Wash codes having a length of 32 chips) for transmission on different ones of a plurality of subbands (see figure 11, channel) in different time intervals (see page 9, [0082], period of time) according to a frequency hopping (FH) sequence).

Both Liang, Bae discloses pilot chips and data. Bae recognizes time division multiplexing the sequence of pilot chips with the sequence of data chips to obtain a time division multiplexed (TDM) sequence of pilot and data chips. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Liang with the teaching of Bae to provide time division multiplexing the sequence of pilot chips with the sequence of data chips to obtain a time division multiplexed (TDM) sequence of pilot and data chips in order to improve the performance of CDMA downlink transmissions, receivers.

27. In the claim 46, claim 46 is rejected with the same reason of claim 4 above.

28. In the claim 47, claim 47 is rejected with the same reason of claim 6 above.

29. In the claim 48, claim 48 is rejected with the same reason of claim 7 above.

30. In the claim 49, Liang discloses, see page 5, [0080], figure 4, the pilot symbols are generated in the frequency domain and later converted back to the time domain and time-multiplexed with spread data. Unlike the packet 40 for data independent pilot

symbols, every block for the new packet structure has a data dependent pilot symbol with pilot chips. The pilot chips 56 for the block 52 is based upon the data 54 for that block 52 (see page 5, [0080], figure 4); comprising:

- Processing at least one pilot symbol (see page 5, [0080], figure 4, the pilot symbols are generated in the frequency domain and later converted back to the time domain and time-multiplexed with spread data. Unlike the packet 40 for data independent pilot symbols, every block for the new packet structure has a data dependent pilot symbol with pilot chips. The pilot chips 56 for the block 52 is based upon the data 54 for that block 52) with a pseudo-random number (PN) code (spread codes) (see page 5, [0077], Data symbols 44 and pilot symbols in the OFDM block 42 for each of the users are individually spread with user-specific spread codes) to obtain a sequence of pilot chips for the wireband (frequency band, see page 1, [0006]) pilot;
- Processing data symbols in accordance with a multi-carrier modulation scheme (see page 5, [0077], these pilot symbols are placed together as an orthogonal frequency division multiplexing (OFDM) block 42 and is common to data symbols 44 for all users. Data symbols 44 and pilot symbols in the OFDM bock 42 for each of the users are individually spread with user-specific spread codes);

However, Liang is silent to disclosing time division multiplexing the sequence of pilot chips with the sequence of data chips to obtain a time division multiplexed (TDM) sequence of pilot and data chips.

Bae et al. discloses time division multiplexing (TDM) (see figure 2, 230) of pilot chips (see figure 1A) with the sequence of data chips (see figure 1A) to obtain a time division multiplexed (TDM) (see figure 2, 230) sequence of pilot (see figure 12) and data chips (figure 12); and transmitting the TDM (see figure 2, 230) sequence of pilot (see figure 12) and data chips (figure 12) (see page 10, [0085], [0086]) on the assigned one of the plurality of subbands (see figure 3);

A modulator (see figure 11, modulator 213) operative to process data symbols (see page 10, table 3, [0087], data symbols) in accordance with a multi-carrier modulation scheme to obtain a sequence of data chips (see figure 11, page 9, [0084], table 3, data chips, figures 12, 12).

Assigning data symbols (see page 10, [0087], data symbol is spread with Wash codes having a length of 32 chips) for transmission on different ones of a plurality of subbands (see figure 11, channel) in different time intervals (see page 9, [0082], period of time) according to a frequency hopping (FH) sequence).

Both Liang, Bae discloses pilot chips and data. Bae recognizes time division multiplexing the sequence of pilot chips with the sequence of data chips to obtain a time division multiplexed (TDM) sequence of pilot and data chips. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system of Liang with the teaching of Bae to provide time division multiplexing the sequence of pilot chips with the sequence of data chips to obtain a time division multiplexed (TDM) sequence of pilot and data chips in order to improve the performance of CDMA downlink transmissions, receivers.

31. In the claim 50, claim 50 is rejected with the same reason of claim 4 above.

Allowable Subject Matter

32. Claims 13-14, 16-17, 29, 31-33, 34, 35 are allowed.

The following is an examiner's statement of reasons for allowance:

Claims 13, 29, 34 are allowed. The prior art (Bae et al. US 2002/0097697 A1) discloses obtaining a sequence of received chips (see figure 12) that includes a time division multiplexing (see figure 2, 230) sequence of received pilot and data chips (see figure 12, [0085], figure 13, [0086]); Demultiplexing (701) (figure 14) the sequence of received chips (see figure 12, page 10, [0089]) to obtain a sequence of received pilot chips (see figure 12, [0085], figure 13, [0086]) for the wideband (frequency band) (see page 2, [0018]) pilot and a sequence of received data chips (see figure 12, [0085], figure 13, [0086]); Processing (see figure 14, [0089]) the sequence of received data chips in accordance with a multi-carrier demodulation (demodulator 715) (see figure 14) scheme and with the plurality of channel response estimates to obtain recovered data symbols (see figure 12, page 10, [0085], figure 13, page 10, [0086]);

However, the prior art (US 2002/0097697 A1) (2003/0165131 A1) of record does not appear to teach or render obvious the claimed limitations in combination with the specific added limitations, as recited from independent claims 13, 29, 34: " processing the sequence of received pilot chips with a pseudo-random number (PN) code to obtain a sequence of chip-spaced gain values based upon a plurality of channel gain estimates for a plurality of propagation paths for the wideband pilot and to obtain the plurality of

channel response estimates for the plurality of subbands based upon transformations of the sequence of chip-spaced gain values"

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

33. Claim 35 are allowed. The following is an examiner's statement of reasons for allowance: the prior art (20030165131, 20020097697, 20030012174, 200401144552, 20020080902) of record does not appear to teach or render obvious the claimed limitations in combination with the specific added limitations, as recited from independent claim 35: "a rake receiver operative to process a sequence of received chips with a pseudo-random number (PN) code to obtain a plurality of channel gain estimates for a plurality of propagation paths for a transmitting entity, wherein the sequence of received chips includes a sequence of combined pilot and data chips transmitted by the transmitting entity and obtained by summing a sequence of pilot chips for a wideband pilot with a sequence of data chips at the transmitting entity; a processor operative to process the plurality of channel gain estimates to obtain a plurality of channel response estimates for a plurality of subband".

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHUONG T. HO whose telephone number is (571) 272-3133. The examiner can normally be reached on 8:00 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu can be reached on (571) 272-3155. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

06/22/06

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